SUBJECT INDEX

A

Acid deposition
  regions sensitive to
    and acid rain, 533
Acid rain
  and policymakers in Europe, 101
  see also Energy and acid rain
Aerodynamics
  fuel-efficient autos, 385
Air pollution
  indoor
    and insulation, 90
  renewable energy sources, 89
  shale oil industry, 354
  threshold levels, 91
  transport of acid rain precursors, 540–43
Air-quality standards
  in China, Japan, Sweden, and United States, 91–100
Alcohol fermentation
  as an energy conversion technique, 17
Alkaline earth oxides
  and low-rank coal, 495
Alternative energy sources
  and acid rain, 554
  lobbies for (appendix), 524–25
Alternative energy-storing specifications, 1
American Society for Testing and Materials
  and low-rank coal, 473
Ammonia-urea production
  and methanol
    in New Zealand, 75
Anaerobic digestion
  and biomass conversion, 18
Aquatic life
  and acid rain, 544–45
Aquifers
  use of
    in energy storage, 12
Ash
  analyses
    of low-rank coals, 483
Atmospheric chemistry
  and acid deposition, 552
Atomic energy
  in Italy, 46
  see also Liquid-metal fast breeder reactor program
Atomic Energy Act Amendments
  and government's monopoly control over nuclear fuel, 511
Auto technology
  prognosis for, 386
Automobile industry
  prognosis in United States, 391–93
Automobiles
  and energy demand behavior, 144
  graduated sales taxes
    in New Zealand, 69
  see also Fuel-efficient autos
Aviation fuels
  in New Zealand, 60
Axicell
  and reactor design
    fusion energy, 315

B

Back-up cycling units
  and electric utilities, 255
Banking
  and electric utility deregulation, 229
Bankruptcy risks
  and electric utilities deregulation, 245
Basic metals
  and energy consumption
    in New Zealand, 60
Batteries
  characteristics of (figure), 20
Beam-heated experiments
  and magnetic fusion energy, 293
Biogas
  composition and installation, 18
  as renewable energy source, 9–10
Biomass
  collection and transportation costs, 16
  conversion to synthetic fuel (figure), 17
  and energy storage, 15–16
Breeder reactors
  see Liquid-metal fast breeder reactor program
Bulk power
  electric utilities
    market experiments, 256–59
Butane
  methyl tertiary butyl ether
    in New Zealand, 74

C

Cadmium poisoning
  as price of industrialization, 81–82
Calcite
  and low-rank coal, 484
Capacity expansion
  and electric utilities deregulation, 259
Capital input
  energy use, technological change, 423
Capital productivity
  energy use, technological change, 415
Carbon dioxide
  buildup in the atmosphere
    and policymaking decisions, 101
  natural gas hydrates
    and forming conditions, 429
Carbon monoxide
  ambient air quality standards for, 94
Carbon/oxygen ratio
  low-rank coals, 482
Carbonyl
  low-rank coal, 495
Carboxylate
  and low-rank coal, 486
Carnot cycle
  and vapor compression heat pumps, 453
Cars
  see Fuel-efficient autos
Catalytic converters
  air-quality standards, 98

Central dispatch
and electric utility deregulation, 239
Charcoal-burning stoves
and fuelwood savings, 204
Chemical energy
storage, 22–24
Chemical heat pump
and salt hydrates, 23
China
dependancy on coal, 100
CHP plants
time-displaced heat loads, 8
Chronic poisoning
and environmental management, 96
Citizen/Labor Energy Coalition (CLEC)
gas bills, 329
Civilian Reactor Development Program
and federal energy regulation, 341–42
Clay stoves
see Mud stoves
Clean Air Act Amendments
and low-sulfur coal, 479
Clean-air areas
three classes
US legislation, 99
Clean-air issues
and energy lobbies, 516
Coal
and acid rain, 530
and CHP plants, 8
demand studies, 107
domestic energy sources, 85
energy lobbies, 515
energy in New Zealand, 53
Federal energy policy, 338–41
gasoline from
in New Zealand, 74
plant construction
in Italy, 40
projected production and consumption
Asia-Pacific region, 86–87
state mines
price control in New Zealand, 68
as a thermal fuel
in New Zealand, 66
see also Low-rank coal
Coal exports
to Japan, 84
Coal lobbies
principal (appendix), 524
Coal liquefaction
and acid rain, 554
Coal plants
electric utility deregulation, 237
Cogeneration
and energy storage, 5
Cold storage
by heat capacity, 27
Colony Project
shutdown
shale oil industry, 363
Combined heat and power production
and energy storage, 5
Combustion
quantitative data on
improved cooking stoves, 211
Commercial demand behavior
data studies, 125
Commercial production
gas from hydrates, 444
Committee chairmanships
in Congress
and energy lobbies, 504
Compact cars
and fuel-economy gains, 389
Competition
and efficiency economics, 322
and electric utilities deregulation, 260
Component design
and fast breeder reactors, 275–76
Compressed air storage
underground (figure), 12
Compressed natural gas (CNG)
New Zealand, 72
Compressed-gas
storage concepts, 11
Compressor
and heat pumps, 449
Conservation
and acid rain, 554
policy and regulation
federal approach, 334–38
price-induced
and the 1979–1980 oil shock, 337
Conservation expenditures
in New Zealand, 70
Construction
economics
and cooking stoves, 214
Consumer energy
GDP rates for various countries, 62
Consumer Expenditure Survey
and transportation, 144
Consumer sectors
and fuel types, 147–48
Consumption
desired quotient
modeling issues, 110
Conversion
fuel oil to coal
in Italy, 47
Cooking methods
range of efficiency (figure), 205
Cooperative load forecasting
and electric utility deregulation, 243
Coordination transactions
and electric utility deregulation, 259
Core physics
and the French breeder reactor program, 267
Cost-control measures
in world oil market, 177
Cost-sharing
shale oil industry, 362
Crops
effects on
of acid rain, 547
Crude oil
access and trade, 156–64
exports
Arab Gulf states, 175
Italian market, 34
supplies, refinery runs (figure), 160–62
traders
segmentation of buyers, 163
Crystalline mineral melilite
and low-rank coal, 489
Cycling
and heat pumps, 464–65

D

Decentralization
in energy policy, 28
Defrosting
and heat pumps, 458
Defrost sensors
and compressors
in heat pumps, 452
Degradation coefficient
and heat pumps, 462
Dehumidification
and heat pumps, 460
Demand behavior
commercial and industrial
see Energy demand behavior
Depressurization
model
and gas hydrates, 441
natural gas hydrates, 437
Deregulation
see also Electric utility deregulation
Developing countries
see Improved cooking stoves in developing countries
see also OPEC, oil export policy and economic development
Diagnostic systems
and vehicle technology, 377
Diesel engines
fuel-efficient autos, 383

Diurnal heat storage
and building styles, 24
DOE fusion program strategy
(figure,) 312
Durability
of materials
and cooking stoves, 203

E

Econometric studies
electric utility deregulation,
237
Economic development
see OPEC, oil export policy
and economic development
Economic output
energy use, technological
change, 415
Economic policies
energy in New Zealand, 55
Economic stability
fuel-efficient autos, 401
Economic theories
of demand
measurement issues, 151
oil market
supply flexibility, 168–70
Economics
see also Energy use, technological change
and productive efficiency
shale oil industry, 355
EEC (see European Economic Community)
Efficiency
as criteria of economic performance, 321
and new-car fuel economy, 376–80
Electric grid
and breeder reactor program, 279
Electric power
in Sweden, 242
transmissions systems
and low-rank coal, 477
Electric power plant
steam
statistics, 234
Electric utility deregulation
analyzing the prospects for competitive generation, 229–60
developing market institutions, 256–59
encouraging market entry, 253–56
enhancing the role of competition, 252–59
evaluating the option, 233–52
long-run planning and investment, 242–49
market structure, 233–38
regulation, 249–51
short-run market operation, 238–42
sources of interest, 230–33
transition considerations, 251–52
Electric vehicle
costs
vs fuel-based vehicle, 21
Electricity
commercial (figure), 128
cost in Italy, 36
industrial (figure), 130–31
Italian energy system, 35
manufacturing
case study, 416–20
in New Zealand, 54
oil dependent
costs of, 41
price controls
in New Zealand, 67–68
residential (figure), 116–17
supply security
in New Zealand, 65
see also Electric utility deregulation
Electricity demand
commercial
demand behavior studies, 127
long-run price elasticity of, 122
residential
models, 114–20
Electricity generation
and coal
in Japan and Sweden, 100
Electrochemical energy storage, 19–22
Electromagnetic energy storage
and superconductors, 14
Electronic air suspension
and vehicle technology, 377
Electrostatic forces
and magnetic fusion forces, 283
Emergency Petroleum Allocation Act (EPAA)
Federal energy regulation, 331
Emission-control technologies
and air quality standards, 98
Emissions
reduction
SO_2 vs NO_x, 550
Employment
and air pollution
in India, 100
Energy
more efficient use of, 90
Energy and acid rain
aquatic effects of, 544–45
causes of, 534–40
chemistry of, 534–40
distribution of, 531–33
effects of, 543–49
effects on crops, 547
effects on materials, 548–49
factors affecting transport, 540–41
health effects, 547–48
liming bodies of water, 549
reducing acid precipitation, 549–50
reducing emissions, 55–52
regions sensitive to acid deposition, 533–34
roots of problem, 529–31
strategies for mitigating, 549–54
strategies for reducing emissions, 552–54
terrestrial effects, 545–47
transport of acid rain precursors, 540–43
transport of nitrogen oxides, 542–43
transport of sulfur oxides, 542–43
Energy consumption
and GDP
in Italy, 31
and prices
in Italy, 36
residential sector at the household level, 106
Energy conversion devices
system aspects, 4–10
Energy crisis
and federal energy regulation, 321, 343–44
Italian response, 36
modeling energy demand, 105
price elasticities, 107
Energy demand
GNP
in Western industrialized countries (OECD), 155
Energy demand behavior
update on econometric studies of
commercial and industrial demands, 125–39
electricity demand, 114–20
estimation techniques, 113
fuel oil, 125, 135–36
functional form, 113
measurement issues, 112–34
modeling issues and options, 108–14
natural gas, 122–25
residential energy demand, 114–25
transportation, 139–46
Energy imports
diversification
and energy policies, 83

diversification of sources, 84
national policies, 81
Energy intensity
rising economic productivity, 413
Energy lobbies
appendix, 521–25
coal, 515–18
natural gas, 508–10
nuclear power, 510–15
oil, 502–8
research and development, 518–20
Energy policy
of New Zealand, 57
Energy pricing
in New Zealand, 67–71
Energy research and development
lobbies, 518–20
in New Zealand, 75
Energy resources
see also Natural gas hydrates
Energy Security Act
shale oil industry, 367
Energy sources
domestic
increased production of, 84
primary
Italian National Energy Plan, 46
Energy storage
chemical energy storage, 22–24
electromagnetic energy storage, 14–15
heat-capacity storage, 24–27
individual storage concepts, 11–27
mechanical energy storage, 11–13
organic fuels, 15–19
system aspects, 4–10
Energy substitution policies
in Italy, 42
Energy Supply and Environmental Coordination Act (ESECA)
and federal policy, 335
Energy use, technological change and productive efficiency
future prospects, 420–21
hypothesis as to the forces at work, 413–15
updating the quantitative record, 411–13
Energy-storage components
individual, 5–6
Engine control
fuel-efficient autos, 391
Engine research
fuel-efficient autos, 391
Entropy
thermodynamic aspects
heat pumps, 453–55
Environment
effects of acid rain, 543–49
health hazards
and biomass fuel, 89
politics
shale oil industry, 370
see also Air quality standards
Environmental controls
and coal, 339–40
systems, 491
Environmental impacts
adverse
and the energy chain, 81–82
Environmental management
and heavy pollution, 96
Environmental protection
French fast breeder reactor program and, 273–75
Environmental Protection Agency (EPA)
limits on subbituminous coal exports, 478
Environmental regulation
and electric utility deregulation, 249
Environmental standards and national energy policies
air-quality standards, 91–100
coal production, 86–87
diversification of sources, 84
more efficient use, 90
reduction of oil imports, 83–84
risk assessment, 90–91
selected aspects and implications, 83–90
switching from oil, 89–90
Equipment
demand for
modeling issues, 108
Equity liftings
major international oil companies, 157
Equity production
loss of
oil exporting countries, 157
Estimation techniques
and energy demand models, 113
Ethane
and natural gas hydrates forming conditions of, 429
Ethanol
and energy storage, 17
European Economic Community (EEC)
and the French fast breeder reactor program, 272
restructuring of refineries, 167
European gas pipeline
Italian participation in, 38
Exports
see also OPEC, oil export policy

F

Fast neutron reactors
breeder reactor program in France, 263–66
Federal energy regulation
coal, 338–41
conservation policy, 334–38
five programs, 325–43
market regulation, 347–48
monopolies and competition, 323
multiple purposes of, 321–25
natural gas, 325–30
nuclear power, 341–43
oil, 330–34
problems of uncertainty, 324–25
regulatory policy, 343–48
restraints, supports, 323–24
Federal Energy Regulatory Commission (FERC)
bulk power
market experiments, 256
Federal leasing policy
coal reserves
"rape of the wilderness", 340–41
Federal policies
see also Federal energy regulation
Financing
energy policy in Italy, 47
Fire
ritual significance of
and cooking stoves, 209
Fire use
and improved cooking stoves, 209
Fisher-Kaysen model
energy demand behavior, 109
Fixed-price forward contract
and electric utility deregulation, 247
Fluidized bed combustion
control technologies
and acid rain, 553
Flywheel storage
state of technology, 13
Foreign debt
and energy, 56
Foreign policy
and the oil lobby, 507
Forestry
energy consumption
in New Zealand, 60

and New Zealand national debt, 56
Forests
and effects of acid rain, 545–47
World Bank report
and cooking stoves, 200
Fossil fuel
consumption
and acid rain, 534
grid distribution system (figure), 7
Free energy
concept
system efficiency, 5
Free-market policy
fuel-efficient autos, 403
Frosting effects
and heat pumps, 464–65
Fuel battery
and engine rating, 21
Fuel cell
and CHP plants, 8
Fuel consumption
by electric utilities, 136–39
and improved cooking stoves, 217
Fuel cycle
and breeder reactors, 269
breeder reactor development program, 276–78
Fuel-efficient autos
progress and prognosis
aerodynamics, 385–86
consciousness of fuel price, 393–94
criteria for consumer choice, 393–98
engines and transmissions, 383–85
facing economic penalties,389–90
gas-guzzler tax, 391
increases in efficiency, 377–78
industry prognosis, 391–92
industry's dilemma, 388–93
integration time, 391
investment for fuel economy, 388–89
issues of planning, 404–5
light-duty trucks, 386–88
potential, 378–80
prognosis for auto technology, 386
range of scenarios, 401–4
urban car potential, 396–98
vehicle technology, 377–88
weight reduction, 381–82
Fuel oil
commercial (figure), 137
and energy demand behavior
commercial, 135
residential, 125
industrial (figure), 138
Fuel-performance focus
and improved cooking stoves, 202–3
Fuel pin
and the French breeder reactor program, 267
Fuel price
and the consumer
fuel-efficient autos, 383–94
Fuel switching
strategies for reducing emissions
and SO_2, 552
Fuel types
and consumer sectors, 147–48
Fuelwood
needs
urban-oriented program, 224
Fuelwood consumption
urban and commercial sectors (figure), 222
Fuelwood crisis
in developing nations, 199
program formulation for, 214–15
Functional form
and energy demand models, 113
Fusion energy
see Magnetic fusion energy
Fusion reactor
scientific feasibility, 281
Future generations
as recipients of consequences of power policies, 101

G

Gas
transition to
in New Zealand, 71–75
see also Liquefied natural gas (LNG)
see also Natural gas hydrates
Gas exploration
in New Zealand, 53
Gas lobbies
(appendix,) 523
Gas production
from hydrates
economics of, 440–44
Gas reticulation
in New Zealand, 52
Gas surplus
Federal energy regulation, 326
Gasoline
and energy demand behavior (figure), 140
market
test for structural change in, 149
Gasoline consumption
and energy demand behavior, 145
Gasoline prices
and consumer spending
fuel-efficient autos, 394–95
GDP growth rates
energy policy in New Zealand, 58
Geopressurized aquifers
as source of natural gas, 427
Geothermal energy
in New Zealand, 54
research and development, 76
Geothermal steam
and Italian domestic resources, 32
Government intervention
in the energy market
in New Zealand, 56–57
Gravitational energy storage
technology, 11
Gross domestic product (GDP)
and the OPEC governments, 182
Groundwater modeling
and shale oil industry, 359
Gypsum
and low-rank coal, 484

H

Health
and coal
Federal energy regulation, 339
effects
of acid rain, 547–48
and improved cooking stoves, 215
policy
and energy lobbies, 502
Heat capacity
storage, 24–27
Heat exchangers
and heat pumps, 457
Heating mode
heat pump (figure), 451
Heating seasonal performance factor (HSPF)
and heating ratios
in heat pumps, 461
Heating values
recoverable reserves
low-rank coals, 474
Heat loads
magnetic fusion energy, 288
Heat pumps
basics, types, performance characteristics
classification, 455

components and controls, 456–59
components and designs, 466–67
compressors, 456–57
controls, 457–59
cycling and frosting effects, 464–66
heat exchangers, 457
interaction with the building, 467
performance and standards, 459–64
research, 464–67
thermodynamic aspects, 453–55
conventional air-to-air design, 460
systems
research, 464
Heat recuperation
compressed-air storage facility (figure), 13
Heat storage
in industrial processes, 26
Heat-transfer processes
adequate quantitative data on and cooking stoves, 211
Hermetic compressors
and heat pumps, 456
High-field axisymmetric magnetic mirror cell
magnetic fusion energy, 309
Historical perspective
energy use, technological change, 420–21
Hydrate equilibrium temperature and gas, 428
Hydrates
see also Natural gas hydrates
Hydrocarbons
and acid rain, 536
and chemical oxidants
catalyzing the formation of, 551
from coal derived synthesis gas, 494
exploration
and international oil companies, 176
Hydronic space heating
and heat pump systems, 455
Hydropower
and mineral fuels (figure), 410

I

Ignition
demonstration of
and fusion power, 281
Import quota system
for oil, 503
Improved cooking stoves in developing countries
disillusionment with stove programs, 203–4
economic constraints, 211–12
opportunities and next steps, 216–25
overview of stove-popularization efforts, 201–2
premature judgments on stove programs, 215–16
program formulation and implementation difficulties, 214–15
rationale for promoting improved stoves, 200–1
sociocultural obstacles, 213
technical constraints, 204–11
Impurity control
and magnetic fusion energy, 299
Industrial capability
French fast breeder reactors, 270–73
Industrial revolution
and acid rain, 530
Inflation
electric power production costs, 230
natural gas hydrates production, 443
Innovation
and government officials, 351
Integration concept
crude-oil market, 172–73
International Atomic Energy Agency (IAEA)
magnetic fusion energy, 307
Ion energies
and magnetic fusion energy, 295
Ion-cyclotron
resonant heating
and magnetic fusion energy, 303
Ion-exchangeable cations
and low-rank coal, 488
Iranian revolution
changes in the world oil market, 159
and Saudi Arabian oil surplus capacity, 188
Irradiation programs
and the French fast breeder reactor program, 267
Irrigation
and improved cooking stoves, 217
Isobutane
and natural gas hydrates forming conditions, 429

J

Japan
and magnetic fusion energy, 305

K

Kaolinite
and low-rank coal, 485
Kuwait
as an OPEC nation, 194–95

L

Labor
foreign
in Saudi Arabia, 193
Labor inputs
ratio of energy use (figure), 414
Lawson criterion
and magnetic fusion energy, 292–93
Legislation
fuel-efficient autos, 390
Lignite
see Low-rank coal
Liquefied natural gas (LNG)
Algerian exports, 186
Liquid-metal fast breeder reactor program
in France
economic outlook, 278–79
fast neutron reactors, 264–66
fuel cycle, 276–78
industrial capability, 270–73
problems to be resolved, 273–79
reactor design, 275–76
safety and environmental protection, 273–75
technical milestones, 266–70
Limestone-injected multistage burner
control technologies
and acid rain, 553
Limestone injection modified burner (LIMB)
EPA-sponsored program, 490
Logging
and natural gas hydrates, 434–35
Low-carbon steel
fuel-efficient autos, 383
Low-rank coal
present and future role in United States
combustion of, 486–90
environment control technology, 490–91

gas conversion processes for, 491–93
occurrence of lignite and subbituminous coal, 473–75
liquefaction of, 494–96
markets, 475–82
preparation methods, 485–86
properties of, 482–85

M

Magnetic confinement
and fusion power reactor, 282
Magnetic fusion energy
progress and directions in confinement concepts and facilities, 282–92
program planning, 303–14
progress in fusion, 292–303
role of fusion, 314–17
Malathion
and acid rain, 549
Malaysia
and the OPEC price structure, 181
Mandatory Oil Import Program
and domestic oil prices, 324
Manufacturing
private domestic business economy, 422–23
Marine sediments
and natural gas hydrates, 433
Market behavior
OPEC nations, 182
Marketing capacities
and energy demand,155
Markets
for coal
in the United States, 475
Market structure
electric utility deregulation, 233
Marlstone
see Shale oil
Mechanization
energy use, technological change, 416
Metal stoves
arguments favoring, 218–19
Methane
natural gas hydrates, 428
Methanol
from coal-derived synthesis gas, 494
Mexico
and the OPEC price structure, 181
Mirror Fusion Test Facility-B (MFTF-B)
and magnetic fusion energy (figure), 291
Moisture
and improved cooking stoves, 206
Monopolies
and electric utility deregulation, 235
Federal energy regulation policy, 323
Mud stoves
arguments for, 219–20
Multifactor productivity
energy use, technological change, 423
Multiple-fuel stove
and improved cooking stoves for developing countries, 211

N

National Energy Plan
oil
federal policy, 332
1977
federal policy, 344–45
Natural gas
and energy lobbies, 508–10
imposing price controls
Supreme Court, 521
and oil production
OPEC nations, 186
Natural gas hydrates
potential of as an energy source
cost computation, 441–44
depressurization, 437–38
detection of naturally occurring hydrate fields, 433–35
drilling response, 434
economics of gas production from, 440–44
estimation of gas recovery, 440–41
logging, 434–35
nature of natural gas hydrates, 428–29
occurrence of hydrates, 430–33
production of gas from, 436–40
production problems, 438–40
seismic profiling, 434
thermal recovery, 436–37
Natural gas regulation
Federal energy policy, 325
Nitric acid
and acid rain, 532
Nitrogen
and natural gas hydrates forming conditions, 429
Nitrogen cycles
and acid rain, 529
Nitrogen oxides
control of
and low-rank coal, 490
Noncontiguous markets
and electric utility deregulation, 247
Nonutility small power production
California PUC framework
market entry, 253–56
Nuclear accident
magnetic fusion energy, 316
Nuclear energy
see also Liquid-metal fast breeder reactor program
see also Magnetic fusion energy
Nuclear industry
political problems of, 513
Nuclear lobbies
and the national level (appendix), 523
Nuclear power
energy lobbies, 511
Federal energy regulation, 341
Nuclear technology
magnetic fusion energy, 311

O

Oceans
and natural gas hydrates, 431
OECD (Organization for Economic Cooperation and Development)
rebuilding equity supplies, 170–72
Office of Energy Research
magnetic fusion energy, 311
Office of Technology Assessment (OTA)
fuel-efficient autos, 378
Offshore drilling
and oil lobbies, 506
Oil
annual report
statistics, 174
domestic and imported, 330–34
and energy lobbies, 502–8
export policy in OPEC
see OPEC
exporting countries
characteristics of, 179
government involvement, 163–64
indicators for downstream development, 166
refining and marketing
downsizing, 165

relations between international companies
and producing nations, 156
supply and disposal
seven major international oil companies, 158
world trade
politicization of, 164
Oil exporters
characteristics of (figure), 180
Oil exports
Soviet
levels in 1982, 181
Oil glut
and fuel-efficient autos, 406
Oil industry
downstream operations
shifting focus on, 164–65
Oil lobbies
appendix, 521–22
Oil market
international
future trends, 175–77
shrinkage, 175
withdrawals from
large companies and independents, 173
world
reduced earnings growth, 173–74
Oil policies
individual OPEC countries, 183–91
Reagan administration, 333
Oil producers
forward integration
and divestiture in the OECD area, 174
shifting balance
international majors, 163
Oil refining
and decreased demand, 155
Oman
and the OPEC price structure, 181
OPEC (Organization of Petroleum Exporting Countries)
export revenues, 183
and LDCs
and oil demand, 167
nations
and US source of liquid fuel, 354
and the OECD
as price adjusters, 173
official government selling price, 159
oil export policy and economic development
average demand for OPEC oil, 189
characteristics of oil-exporting countries, 179–82
high demand for OPEC oil, 188–89
low demand for OPEC oil, 189–91
oil policy of individual countries, 183–88
recent economic developments, 191–98
oil prices, 333–34
security of supply, 169
upstream and downstream functions for, 157
Oxidizing agents
and acid rain, 535

P

Parathion
and acid rain, 549
Permafrost
and natural gas hydrates, 431
Persian Gulf
and Iran-Iraq war, 187
Petroleum
see also Synthetic fuels
Plasma
magnetic fusion energy, 285–86
Plutonium
and fast breeder reactor program
in France, 266
Political conditions
relevant to oil price
OPEC nations, 187
Political conflict
shale oil industry, 360–65
Power plants
coal-based
and electric utility deregulation, 255
Pressure-enthalpy diagram
and vapor compression cycle
in heat pumps, 454
Pressurized water reactors
and the French breeder reactor program, 265, 271
Price collapse
oil industry
1979–1983, 180–81
Price control
fuel-efficient autos, 399
Price regulation
see Electric utility deregulation
Price speculation
and mainstream supplies, 169
Pricing approach
fuel-efficient autos, 391
Princeton Beta Experiment
and magnetic fusion energy, 303
Private domestic business economy
average annual rates of change in energy intensity (figure), 412
Producer-consumer relationships
electric utility deregulation, 248
Producer-to-pipeline sales
of oil
and energy lobbies, 509
Production allocations
OPEC countries, 190
Production capacities
and the OPEC nations, 184
Productive efficiency
see Energy use, technological change, and productive efficiency
Productivity growth
energy efficiency, 421–22
Project independence
and energy policy, 332
Pronuclear coalitions
and energy lobbies, 514
Propane
and natural gas hydrates
forming conditions of, 429
Public Utilities Regulatory Policy Act (PURPA)
electric and gas utilities, 345
Pyrite
and low-rank coal, 484
Pyritic sulfur
conventional cleaning methods and low-rank coal, 486

R

Radioactive waste
potential for tritium release
magnetic fusion energy, 317
Reactor design
commercial viability, 275–76
Reactor waste
magnetic fusion energy, 314
Reagan decontrol plan
NGPA, 328
Refining sector
oil
improving effectiveness, 167
Refrigerant
and heat pumps, 448
Refrigerant charge
research
and heat pumps, 466
Regional load curve

and electric utility deregulation, 243
Regional transmission grid
and electric utility deregulation, 240
Regulatory intervention
fuel-efficient autos, 404
Reheater component
and the French breeder reactor program, 268
Renationalization
and the seven oil majors, 156
Research and development
alternative sources of energy, 518
fuel-efficient autos, 405
Reserve sharing
and electric utility deregulation, 243
Reserves-to-production ratios
and the OPEC nations, 185–86
Reservoirs
for gas hydrates, 436–40
Retail rate regulation
and electric utility deregulation, 251
Rolling resistance
fuel-efficient autos, 385
Rural households
fuelwood outtake, 220–21
Rural mud stoves
see Improved cooking stoves in developing countries

S

Safety
and coal
Federal energy policy, 339
French breeder reactor program, 273
and improved cooking stoves, 215
Saudi Arabia
annual GDP, 192
Scarcity
and the French breeder reactor program, 264
Screw compressors
and heat pumps, 457
Sea spray
and acid rain, 538
Seismic profiling
and natural gas hydrates, 434
Seniority system
House of Representatives
and the oil lobby, 505
Shale oil
and the politics of ambiguity
air pollution, 354
economics, 355–56
policy: Colorado, 365–66
policy: federal, 367–70
political conflict, 360–65
potential of shale oil, 352–54
problems facing the industry, 354–60
solid waste disposal, 354–55
water pollution, 359–60
water supply, 356–59
Short-term wholesale transactions
and electric utility deregulation, 239
Siting authority
and electric utility deregulation, 249
Slagging combustors
and low-rank coal, 487
Socal
and antitrust suit, 156
Sodium technology
and French breeder reactor program, 267
Solar energy
and heat pump systems, 464
Solar radiation
and performance standards of heat pumps, 459
Solid waste disposal
shale oil industry, 354
Spot market proposals
and electric utility deregulation, 241
Spot markets
oil
supply flexibility, 168–70
Stove life
design and materials variable, 209–10
Strip mining
and energy lobbies, 516
Structural change in the international oil industry
rebuilding equity supplies, 170–71
supply flexibility, 168–70
validity of integration concept, 172–73
Subbituminous coal
see Low-rank coal
Suboceanic hydrates
natural gas hydrates, 433
Sulfur
and acid rain, 529
amount of dry deposition and acid rain, 539
bonded with coal
and clean-air legislation, 517
emissions
and acid rain, 537
Sulfur dioxide
ambient air quality standards for, 94
emissions
and low-rank coal, 485
Sulfuric acid
aerosol
and lung function, 548
Sulfur oxides
transport of
and acid rain, 541
Sumptuary controls
and Federal energy regulation, 338
Superphenix
safety in breeder reactor programs, 274
Synfuels
advocates and opponents of, 368–70
coal based
crossover point with oil and natural gas, 480
and energy lobbies, 519
shale oil politics, 365
Synthetic Fuel Corporation
and Federal energy regulation, 346–47

T

Tandem mirror concept
magnetic fusion energy, 297
Tax
gas-guzzler
fuel-efficient autos, 391
Technical expertise
fast breeder reactor program in France, 266–70
Technological change
see also Energy use, technological change
Technology
auto industry's dilemma, 388
Telecommunications
and electric utility deregulation, 229
Testing methods
and the French breeder reactor program, 270
and improved cooking stoves, 207
magnetic fusion energy, 307
Theory of development economics
OPEC countries policy, 182
Thermal barrier
features of
magnetic fusion energy, 299
and magnetic fusion energy, 285–86
reactor design
fusion energy, 315

Thermal energy
and heat pumps, 447
Thermal equilibrium
in thermodynamic aspects
heat pumps, 453–55
Throttle coil
and reactor design
fusion energy, 315
Time trends
price elasticity studies, 123
Tokamak
and magnetic fusion energy, 286–87
Toroidal current
in plasma
fusion energy, 286
Total installed mechanical power
energy use, technological change, 424
Trace-element analysis
and acid rain, 542
Transboundary pollution
and acid rain, 550
Transition planning
and electric utilities deregulation, 251
Transmission
fuel-efficient autos, 383
Transmission capacities
and electric utilities deregulation, 252
Transport
energy in New Zealand, 59
Transportation
and electric utility deregulation, 229
and energy demand behavior, 139
and French breeder reactor program, 279
and the oil industry
decreased demand, 155
Tritium release
radioactive waste
fusion energy, 317
Trucks
and energy demand behavior, 144
light-duty
fuel economy, 386–88

U

Unit-drive production systems
distribution of power, 419
United Arab Emirates
as OPEC nation, 195
Uranium
market depression
fast breeder reactor program, 279
Uranium development
shale oil politics, 364
Uranium-238 isotope
and fast breeder reactor program
in France, 266
Urban travel
and subcompacts, 396
US Natural Gas Policy Act (NGPA)
and Federal energy regulation, 327–28
Utilities
electric
current overcapacity, 481
see also Electric utility deregulation
Utilities overexpansion
electric
financial position, 231

V

Vapor compression cycle
in heat pumps, 449–50
Vehicle technology
and electronic air suspension, 377
Vertical disintegration
and electric utility deregulation, 245
Vertical integration
see Integration concept
Vitrinites
coal (figure), 482
Volcanoes
and acid rain, 538

W

Water pollution
shale oil industry, 359–60
Watershed
and acid rain, 531
liming of
and acid rain, 549
Water supply
shale oil industry, 536
Wastewater treatment
and slagging fixed-bed gasifier (SFBG)
low-rank coal, 493
Weather
as factor affecting transport
acid rain, 540–41
Weight reduction
and fuel efficiency, 381
Western Europe
and refining
oil companies, 177
Wholesale relationships
electric utility deregulation, 239
Wind energy
storage capacity implications, 3
Windfall profits tax measure
Federal energy regulation, 346
and oil lobbies, 506
Wind turbine
electric power systems
storage, 4
Wood gasification
energy in New Zealand, 77